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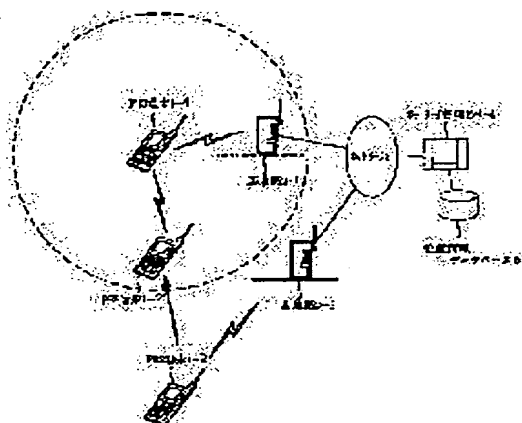
(72)Inventor : KAWAMURA TAKUSHI

(54) COMMUNICATION SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To allow the user not to pay a useless communication charge and to allow the communication enterprise to prevent a limited radio channel resource from being used in waste by conducting transceiver communication without fail when a terminal of a communication opposite party is located at a zone where transceiver communication is available.

SOLUTION: The communication system has a plurality of terminals 1 for radio communication, base stations 2 and a channel network 3 and in this communication system, channel network communication thorough the base stations 2 and the channel network 3 and transceiver communication between the terminals 1 are used in common. In this case, the system is provided with an opposite position discrimination means that whether or not a opposite terminal 1-2 is resident in an area where the transceiver communication is available and with a communication system changeover means that either the channel network communication or the transceiver communication is selected according to the discrimination result by the opposite position discrimination means to change over the communication.



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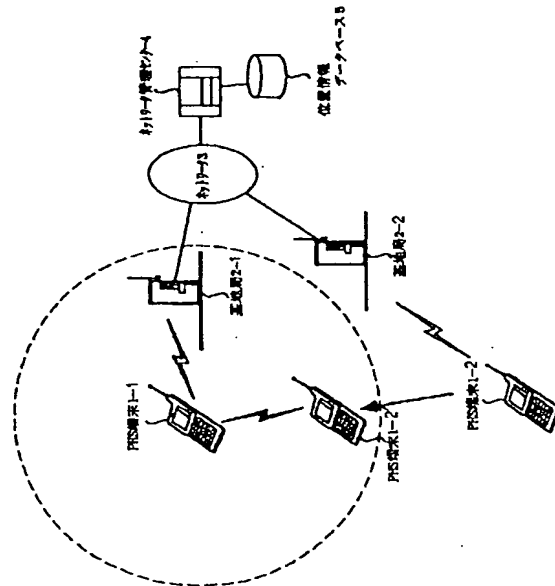
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(54) 【発明の名称】 通信システム

(57) 【要約】

【課題】 通信相手の端末がトランシーバ通信が可能な範囲に位置する場合は必ずトランシーバ通信が行えるようにして、利用者は無用な通信料を払わなくても済み、通信事業者側は限られた無線回線資源を無駄に使用されることをなくした通信システムの実現を課題とする。

【解決手段】 無線通信を行う複数の端末 1 と、基地局 2 と、回線網 3 を有し、基地局 2 および回線網 3 を介した回線網通信と端末 1 同士が直接無線通信するトランシーバ通信とが併用される通信システムにおいて、相手側の端末 1-2 がトランシーバ通信可能な領域にあるかどうかを判定する相手位置判定手段と、相手位置判定手段の判定結果にしたがって回線網通信とトランシーバ通信のいずれかを選択して通信の切り換えを行う通信方式切り換え手段とを設ける。



【特許請求の範囲】

【請求項1】 無線通信を行う複数の端末と、基地局と、回線網を具備し、前記基地局および前記回線網を介した回線網通信と前記端末同士が直接無線通信するトランシーバ通信とが併用される通信システムにおいて、相手側の端末がトランシーバ通信可能な領域にあるかどうかを判定する相手位置判定手段と、前記相手位置判定手段の判定結果にしたがって前記回線網通信と前記トランシーバ通信のいずれかを選択して通信の切り換えを行う通信方式切り換え手段とを具備することを特徴とする通信システム。

【請求項2】 前記回線網通信を行うための電話番号と、前記トランシーバ通信を行うための発信番号をリンクさせる番号リンク手段を有し、前記通信切り換え手段は前記番号リンク手段のリンク内容にしたがって通信の切り換えを自動的に行うことを特徴とする請求項1に記載の通信システム。

【請求項3】 基本通信系としてPHSが適用されることを特徴とする請求項1または請求項2に記載の通信システム。

【請求項4】 前記相手位置判定手段は通信対象である相互の端末が属する基地局のCSIDが一致した場合にトランシーバ通信可能な領域にあると判定することを特徴とする請求項1または請求項2または請求項3に記載の通信システム。

【請求項5】 前記回線網通信中に前記トランシーバ通信の発信を行う通話中発信手段と、前記回線網通信中に前記トランシーバ通信による着信を行う通話中着信手段とを有し、前記回線網通信中に前記トランシーバ通信の発信および着信が確立された場合には、前記通信切り換え手段は前記回線網通信を前記トランシーバ通信に切り換えることを特徴とする請求項1または請求項2に記載の通信システム。

【請求項6】 前記端末は前記トランシーバ通信中に前記トランシーバ通信の通信品質を判定する通信品質判定手段を有し、前記通信品質判定手段が通信品質の悪化を判定した場合に前記通信切り換え手段によって前記トランシーバ通信を前記回線網通信に切り換えることを特徴とする請求項1または請求項2に記載の通信システム。

【請求項7】 前記相手位置判定手段は通信対象である相互の端末が属する基地局のCSIDが一致した場合にトランシーバ通信可能な領域にあると判定することを特徴とする請求項3に記載の通信システム。

【請求項8】 前記回線網通信中に前記トランシーバ通信の発信を行う通話中発信手段と、前記回線網通信中に前記トランシーバ通信による着信を行う通話中着信手段とを有し、

前記回線網通信中に前記トランシーバ通信の発信および

着信が確立された場合には、前記通信切り換え手段は前記回線網通信を前記トランシーバ通信に切り換えることを特徴とする請求項3に記載の通信システム。

【請求項9】 前記端末は前記トランシーバ通信中に前記トランシーバ通信の通信品質を判定する通信品質判定手段を有し、前記通信品質判定手段が通信品質の悪化を判定した場合に前記通信切り換え手段によって前記トランシーバ通信を前記回線網通信に切り換えることを特徴とする請求項3に記載の通信システム。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は通信装置に関し、特に基地局およびネットワークを介した通信と直接端末間で行う通信とが可能な無線通信端末に関する。

【0002】

【従来の技術】 従来、複数端末間の無線通信において、基地局およびネットワークを介した通信と直接端末同士で行うトランシーバ通信とが併用されている通信システムとして、例えばPHS(Personal Handyphone System)がある。現在のPHSでは、基地局を介した通信を行うか、あるいはトランシーバ通信(子機間直接通話とも呼ばれる)を行うかの決定はPHS端末の利用者に一任されている。

【0003】 しかしこのような方法であると、相手側端末と自己端末の間でトランシーバ通信が可能であるにもかかわらず、各端末の利用者がそれに気付かない場合は、基地局およびネットワークを介した通信を行ってしまうことになる。そのため、端末の利用者にとっては、ネットワークを介したために、そのネットワークを使用したことに対する本来無用な課金がかかるという問題が発生する。一方、回線を提供する通信事業者側からみると、課金はできるものの端末、基地局間の限られた通信資源が無駄に使われるという問題も同時に発生していることになる。

【0004】

【発明が解決しようとする課題】 上述のごとく、基地局およびネットワークを介した回線網通信と直接端末同士で行うトランシーバ通信とが可能なPHSのような通信系において、従来は通信端末同士がトランシーバ通信が可能な範囲に位置していても端末の利用者がそれに気付かず基地局およびネットワークを介した通信を行ってしまい、不要な料金を取られたり、不必要な回線使用を行ってしまうといった問題があった。

【0005】 本発明はこの点を解決して、通信相手の端末がトランシーバ通信が可能な範囲に位置する場合は必ずトランシーバ通信が行えるようにして、利用者は無用な通信料を払わなくても済み、通信事業者側は限られた無線回線資源を無駄に使用されることをなくした通信システムの実現を課題とする。

【0006】

【課題を解決するための手段】上記目的を達成するため、本発明は、無線通信を行う複数の端末と、基地局と、回線網を具備し、前記基地局および前記回線網を介した回線網通信と前記端末同士が直接無線通信するトランシーバ通信とが併用される通信システムにおいて、相手側の端末がトランシーバ通信可能な領域にあるかどうかを判定する相手位置判定手段と、前記相手位置判定手段の判定結果にしたがって前記回線網通信と前記トランシーバ通信のいずれかを選択して通信の切り換えを行う通信方式切り換え手段とを具備することを特徴とする。

【0007】

【発明の実施の形態】以下、本発明にかかる通信装置を添付図面を参照にして詳細に説明する。以下の実施の形態は、本発明をPHSの通信系に適用した場合を例にして説明する。図1にPHS通信系の構成を示す。PHS通信系はPHS通信機能を有するPHS端末1、複数のPHS端末1と無線を介して接続される基地局2、ISDN(Integrated Services Digital Network)、PSTN(Public Switched Telephone Network: 公衆交換電話網)を含むネットワーク3および通信事業者側に設けられた位置情報データベース5を含むネットワーク管理装置4から構成されている。

【0008】この構成で、PHS端末1-1は基地局2およびネットワーク3を介して他のPHS端末1-2やネットワーク3に直結されている一般電話端末などの通信端末を呼び出し、あるいは呼び出されて通信を行うことができる。PHS端末1の現在の位置はそれが接続される基地局2のIDに基づいて、位置情報データベース5を有するネットワーク管理装置4によって管理されている。

【0009】PHS通信系ではこのようなネットワーク3を介した通信接続機能の他に、PHS端末1-1と1-2同士で直接トランシーバ通信する子機間直接通話機能を有する。この子機間直接通話機能では、予めお互いのPHS端末1に対して共通なIDを登録し、その共通IDおよび同一の共通IDを持っているPHS端末1を区別する発信番号に基づいて通信が行われる。

【0010】本発明では、複数のPHS端末1が互いにトランシーバ通信可能な領域に属している場合には、必ずトランシーバ通信を優先して行うようにする通信システムを提供することを目的とし、ここでは発呼時の通信方式と通話中の通信方式とについて説明する。

【0011】このシステムにおいては、相手側PHS端末の公衆回線電話番号と同じ相手のトランシーバ通信を行うための発信番号はリンクされて記憶されているものとし、公衆回線網通信とトランシーバ通信の切り換えを自動的に行われるものとする。このリンク機能はPHS端末1に設けられても、ネットワーク管理装置4のデータベース内に設けられてその都度PHS端末1から参照されるようにしても良い。また、自動切り換えの機能も

PHS端末1に設けられてもあるいはネットワーク管理装置4に設けられても良い。

【0012】1) 発呼時

発呼時の通信方式の例として2つの例を挙げて説明する。第1の例は、PHS端末が先ずトランシーバ通信による発信を試み、着信ができなかった場合に、引き続き公衆回線網での発呼を行う方式であり、第2の例は、相手側PHS端末がトランシーバ通信が可能な領域内に存在しているかどうかをネットワーク管理装置4に問い合わせ、トランシーバ通信可能な領域内に存在していると判断された場合にはトランシーバ通信による発信を行い、そうでない場合には公衆回線網での発呼を行う方式である。

【0013】例1

図2に、先ずトランシーバ通信による発信を試みる場合の通信手順を示す。発呼側のPHS端末1-1が発呼時に、相手側PHS端末1-2固有の公衆回線電話番号をダイヤルして公衆回線網での発呼を行った場合、相手側PHS端末がトランシーバ通信のための共通IDを有する相手先であることがリンク機能で確かめられた場合には、最初トランシーバ通信による発信を行う。これに応じて相手側PHS端末1-2が着信した場合には(図2(a))、そのままトランシーバ通信で通信を継続する。一方、トランシーバ通信による発信に応じた着信の応答がなかった場合には(図2(b))、引き続いて基地局2、ネットワーク3を介する公衆回線網通信を試み、公衆回線網による通話を行う。

【0014】例2

図3および図4に、トランシーバ通信が可能な領域に存在しているかどうかネットワーク管理装置4に問い合わせ、通信を行う場合の通信手順を示す。PHSにおいては、通話時あるいは待ち受け時に、基地局2側で随時、各PHS端末1が現在の基地局2に属しているかを各PHS端末1固有のPSIDと各基地局2固有のCSIDによって調べ、その結果をネットワーク管理装置4で管理している。

【0015】発呼時に相手側PHS端末1-2固有の公衆回線電話番号をダイヤルすると、ネットワーク管理装置4は相手側PHS端末1-2が同一基地局の通信エリア内にあるかどうかを判定する。ネットワーク管理装置4が相手側PHS端末1-2が同一基地局の通信エリア内にあると判断した場合には、互いにトランシーバ通信が可能であると見做して、その旨を発呼側のPHS端末1-1に通知する(図3)。

【0016】この通知を受けとった発呼側のPHS端末1-1は引き続きトランシーバ通信による発信を行う。この際、実はトランシーバ通信のエリアに入っていないでトランシーバ着信が行えなかった場合は、再度、公衆回線電話番号による発呼を行う。ネットワーク管理装置4はこの再発呼を認識して公衆回線網による通話を

実現する。

【0017】一方、発呼に対してネットワーク管理装置4が相手側PHS端末1-2が同一基地局の通信エリア内ないと判断した場合には、トランシーバ通信が不可能であると見做して、その旨を発呼側のPHS端末1-1に通知するとともに、公衆回線電話番号による発呼に回答して公衆回線網による通話を実現する(図4)。

【0018】これを実現するためには、ネットワーク管理装置4に以上の処理を管理し実行するための所定の機能が用意されている。

2) 通話時

通話時の通信方式の例として3例を挙げて説明する。第1および第2の例は、2台のPHS端末1-1、1-2が公衆回線網を介して相互に通話を行っている最中に、PHS端末1-1、1-2のいずれかが相互にトランシーバ通信が可能なエリア内に入った場合に、公衆回線網通信からトランシーバ通信に切り換える場合の方式であり、第3の例は、2台のPHS端末1-1、1-2がトランシーバ通信によって通信を行っている最中に相互のトランシーバ通信が不可能になりそうな場合に、トランシーバ通信から公衆回線網通信に切り換える場合の方式である。

【0019】例1

図5に、公衆回線網を介して通話中にトランシーバ通信に移行する場合の通信手順を示す。2台のPHS端末1-1、1-2が公衆回線網を介して通話中に、ネットワーク管理装置4がこれらのPHS端末1-1、1-2が同一のあるいは近接した基地局2にアクセスしていることをCS-IDによって判断した場合、相互に接近した位置にいるものとしてトランシーバ通信への移行を図る。トランシーバ通信が可能であった場合には、PHS端末1-1は公衆回線網通話を切断してトランシーバ通信を行う。もし、実はさほど2台のPHS端末1-1、1-2が近い位置にはなくトランシーバ通信による接続に失敗した場合には、そのまま公衆回線網を介した通話を継続する。

【0020】例2

図6に、公衆回線網を介して通話中にトランシーバ通信に移行する場合の他の方法による通信手順を示す。この方式では、2台のPHS端末1-1、1-2が公衆回線網を介して通話中においても、平行してトランシーバ通信による発信および待ち受けを行う機能を追加したものである。すなわち発呼側のPHS端末1-1は公衆回線網を介して通話中においても、別の無線回線を用いてトランシーバ通信の発信を繰り返し行う。また、着信側のPHS端末1-2は公衆回線網を介して通話中にもトランシーバ通信による着信を待ち受けている。そうして、着信側のPHS端末1-2がトランシーバ通信の発信を受け、公衆回線網を介しての通話を切断した後、トランシーバ通信を確立して実行する。

【0021】例3

図7に、トランシーバ通信で通話中に公衆回線網による通信に移行する場合の通信手順を示す。2台のPHS端末1-1、1-2がトランシーバ通信で通話中に、無線区間の受信レベルが低下したことをどちらかのPHS端末(仮に1-1)が検知したとき、検知したPHS端末1-1は基地局2-1に対して発呼して公衆回線網通信による呼び接続を要求する。基地局2-1からこの呼び接続に対する受け付け応答が返ってきた場合にはPHS端末1-1は即座にトランシーバ通信を切断して、基地局2およびネットワーク3を経由する公衆回線網通信を行う。

【0022】以上の例を現在のPHSに適用した場合、公衆回線網通信とトランシーバ通信とは使用する無線のチャンネルが異なるため、通信方法切り換え時に2種類の通信を行っておくためには、2系統の無線通信機能が必要になる。

【0023】

【発明の効果】以上説明したように本発明の請求項1の発明は、無線通信を行う複数の端末と、基地局と、回線網を具備し、基地局および回線網を介した回線網通信と端末同士が直接無線通信するトランシーバ通信とが併用される通信システムにおいて、相手側の端末がトランシーバ通信可能な領域にあるかどうかを判定する相手位置判定手段と、相手位置判定手段の判定結果にしたがって回線網通信とトランシーバ通信のいずれかを選択して通信の切り換えを行う通信方式切り換え手段とを具備することを特徴とする。これにより、端末が相互にトランシーバ通信が可能な領域にある場合には必ずトランシーバ通信で通話が実行されるようになり、利用者はトランシーバ通信が可能であるにも拘らず高価な公衆回線網を用いたため本来不必要な通信料を支払わなくてはならないという問題がなくなる。また通信事業者側にとっても課金するとはいえ、限られた無線回線資源を無駄に使用されることをなくすることができる。

【0024】本発明の請求項2の発明は、回線網通信を行うための電話番号と、トランシーバ通信を行うための発信番号をリンクさせる番号リンク手段を有し、通信切り換え手段は番号リンク手段のリンク内容にしたがって通信の切り換えを自動的に行うことを特徴とする。これにより、公衆回線電話番号で発呼した通信をトランシーバ通信に切り換えたり、トランシーバ通信の発信番号で呼び出したトランシーバ通信から公衆回線網通信に切り換えることが自動的に可能になり、切り換えのために余分な操作を行うことなく自動的に切り換えが実現され、使い勝手に優れた通信システムを実現することができる。

【0025】本発明の請求項3の発明は、上記の通信システムの基本通信系としてPHSを適用する。これにより、PHSの機能が有効に利用でき、全体として廉価で

機能的な通信システムを実現することができる。

【0026】本発明の請求項4、請求項7の発明は、相手位置判定手段は通信対象である相互の端末が属する基地局のCS IDが一致した場合にトランシーバ通信可能な領域にあると判定することを特徴とする。これにより、従来からある機能を用いて容易に相手端末の位置判定を行うことができ、システムを廉価に構成することができる。

【0027】本発明の請求項5、請求項8の発明は、回線網通信中にトランシーバ通信の発信を行う通話中発信手段と、回線網通信中にトランシーバ通信による着信を行う通話中着信手段とを有し、回線網通信中にトランシーバ通信の発信および着信が確立された場合には、通信切り換え手段は回線網通信をトランシーバ通信に切り換えることを特徴とする。これにより、トランシーバ通信の可能性が新たに発生した場合には必ずトランシーバ通信に切り換えることができ、利用者は高価な公衆回線網を用いた通信料を支払わなくてはならないという問題がなくなり、通信事業者側は、限られた無線回線資源を無駄に使用されることをなくすることができる。

【0028】本発明の請求項6、請求項9の発明は、端末はトランシーバ通信中にトランシーバ通信の通信品質を判定する通信品質判定手段を有し、通信品質判定手段が通信品質の悪化を判定した場合に通信切り換え手段に*

*よってトランシーバ通信を回線網通信に切り換えることを特徴とする。これにより、通話品質が悪化したままトランシーバ通信を継続することがなくなり、トランシーバ通信の通話品質が悪化したときは自動的に公衆回線網通信に切り換えられて通話の品質が維持できる。

【図面の簡単な説明】

【図1】本発明が適用されるPHS通信系の構成を示す図。

【図2】本発明の一実施の形態の通信手順を示す説明図。

【図3】本発明の他の実施の形態の通信手順を示す説明図。

【図4】本発明のさらに他の実施の形態の通信手順を示す説明図。

【図5】本発明のさらに他の実施の形態の通信手順を示す説明図。

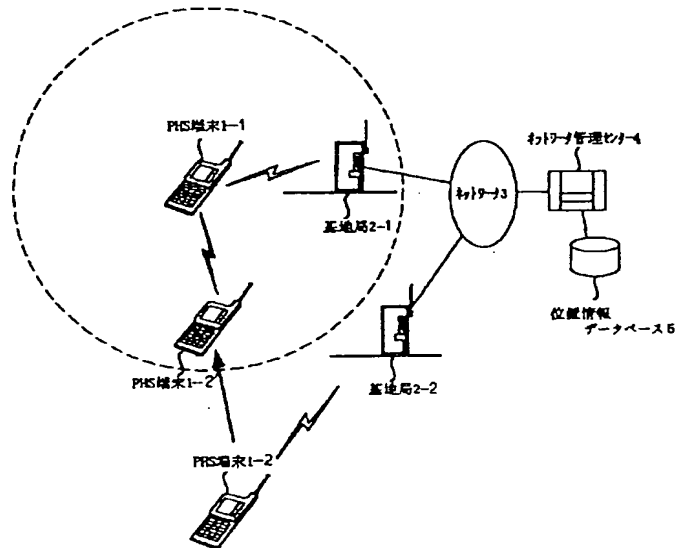
【図6】本発明のさらに他の実施の形態の通信手順を示す説明図。

【図7】本発明のさらに他の実施の形態の通信手順を示す説明図。

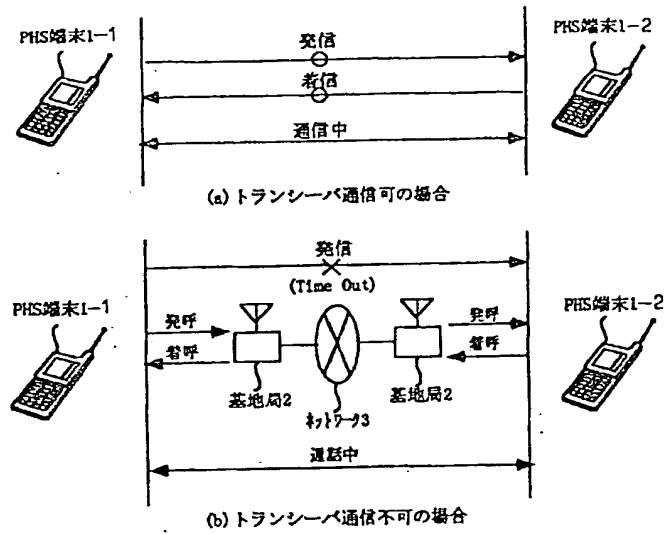
【符号の説明】

1……PHS端末、2……基地局、3……ネットワーク、4……ネットワーク管理装置、5……位置情報データベース。

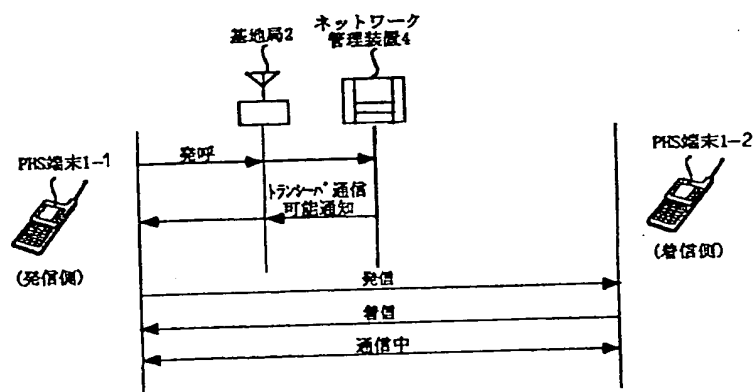
【図1】



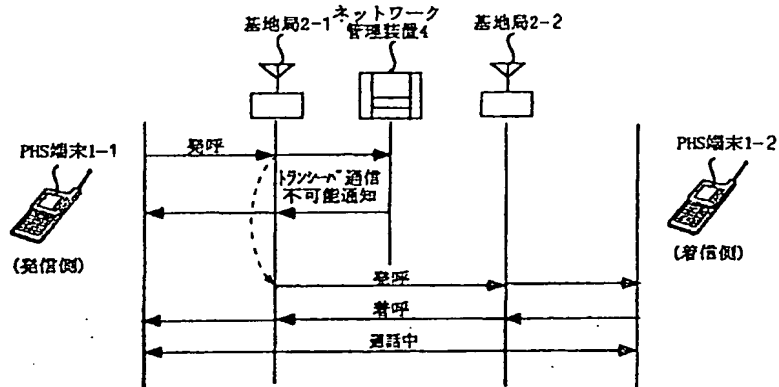
【図2】



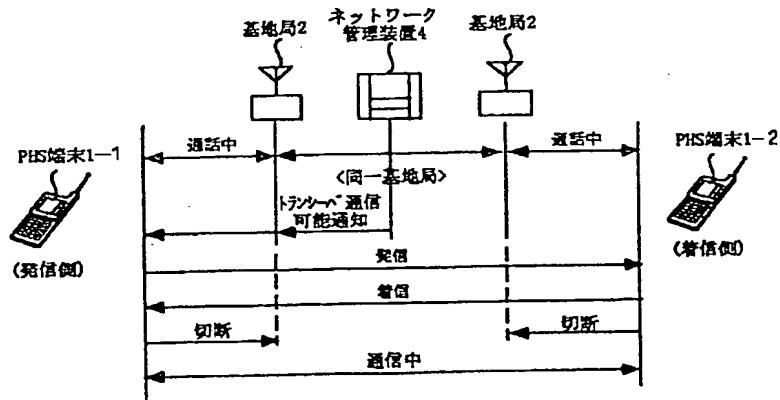
【図3】



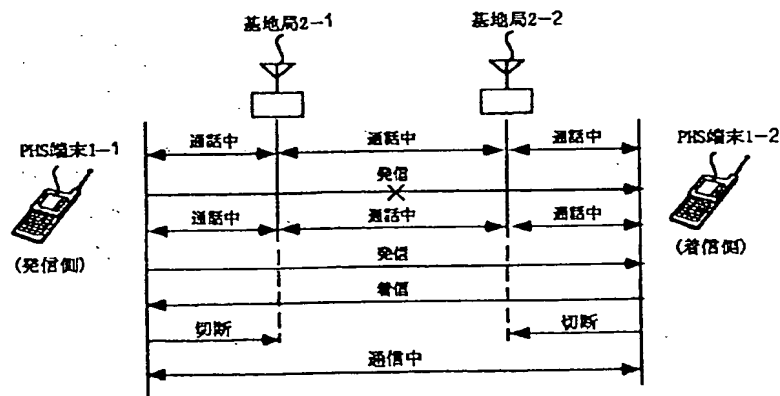
【図4】



【図5】



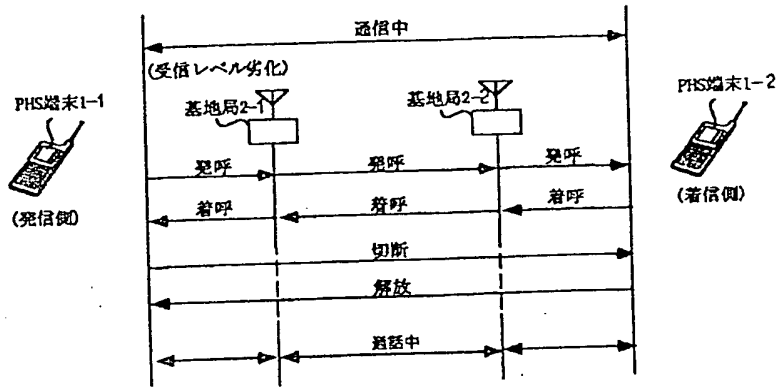
【図6】



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【図7】



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CLAIMS

[Claim(s)]

[Claim 1] Communication system with which two or more terminals which are characterized by providing the following, and which perform radio, a base station, and the transceiver communication with which the line network communication which possessed the line network and minded the aforementioned base station and the aforementioned line network, and the aforementioned terminals radiocommunicate directly are used together. A partner position judging means to judge whether the terminal of the other party is in the field in which transceiver communication is possible. A communication-mode switch means to choose the aforementioned line network communication or the aforementioned transceiver communication according to the judgment result of the aforementioned partner position judging means, and to switch communication.

[Claim 2] It is the communication system according to claim 1 which has the number link means to which the telephone number for performing the aforementioned line network communication and the message serial number for performing the aforementioned transceiver communication are made to link, and is characterized by the aforementioned communication switch means switching communication automatically according to the content of a link of the aforementioned number link means.

[Claim 3] Communication system according to claim 1 or 2 characterized by applying PHS as a basic communication system.

[Claim 4] The aforementioned partner position judging means is CS of the base station where the mutual terminal which is a candidate for communication belongs. Communication system according to claim 1, 2, or 3 characterized by judging with it being in the field in which transceiver communication is possible when ID is in agreement.

[Claim 5] It is the communication system according to claim 1 or 2 carry out that the aforementioned communication switch means switches the aforementioned line network communication to the aforementioned transceiver communication when it has a dispatch means and a call-waiting means carry out the arrival by the aforementioned transceiver communication during the aforementioned line network communication, during the telephone call send the aforementioned transceiver communication during the aforementioned line network communication and dispatch and the arrival of the aforementioned transceiver communication are established during the aforementioned line network communication as the feature.

[Claim 6] The aforementioned terminal is the communication system according to claim 1 or 2 carry out switching the aforementioned transceiver communication to the aforementioned line network communication by the aforementioned communication switch means when it has a communication quality judging means to judge the communication quality of the aforementioned transceiver communication during the aforementioned transceiver communication and the aforementioned communication quality judging means judges aggravation of communication quality as the feature.

[Claim 7] The aforementioned partner position judging means is CS of the base station where the mutual terminal which is a candidate for communication belongs. Communication system according to claim 3 characterized by judging with it being in the field in which transceiver

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communication is possible when ID is in agreement.

[Claim 8] It is the communication system according to claim 3 carry out that the aforementioned communication switch means switches the aforementioned line network communication to the aforementioned transceiver communication when it has a dispatch means and a call-waiting means carry out the arrival by the aforementioned transceiver communication during the aforementioned line network communication, during the telephone call send the aforementioned transceiver communication during the aforementioned line network communication and dispatch and the arrival of the aforementioned transceiver communication are established during the aforementioned line network communication as the feature.

[Claim 9] The aforementioned terminal is the communication system according to claim 3 carry out switching the aforementioned transceiver communication to the aforementioned line network communication by the aforementioned communication switch means when it has a communication quality judging means to judge the communication quality of the aforementioned transceiver communication during the aforementioned transceiver communication and the aforementioned communication quality judging means judges aggravation of communication quality as the feature.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] Especially this invention relates to the radio terminal in which communication through the base station and the network and the communication performed between direct terminals are possible about a communication device.

[0002]

[Description of the Prior Art] Conventionally, in the radio between two or more terminals, there is PHS (Personal Handyphone System) as communication system with which communication through the base station and the network and the transceiver communication performed at direct terminals are used together. in the present PHS, communication through the base station is performed or transceiver communication (a cordless handset — called a between direct telephone call) is performed — that determination is entrusted with the task of the user of a PHS terminal

[0003] However, although transceiver communication is possible between an other party terminal and a self-terminal in it being such a method, when the user of each terminal does not notice it, communication through the base station and the network will be performed. Therefore, for the user of a terminal, since the network was minded, the problem that accounting unnecessary originally to having used the network is made occurs. On the other hand, when it sees clitteringly a contractor side at the time of the communication which offers a circuit, accounting will also have generated simultaneously the problem that the terminal of what is made, and the communication resources with which it was restricted between base stations are used vainly.

[0004]

[Problem(s) to be Solved by the Invention] In a communication system like PHS in which the line network communication which minded the base station and the network like **** and the transceiver communication performed at direct terminals are possible, even if communication terminals were conventionally located in the range in which transceiver communication is possible, there was a problem that perform communication which minded the base station and the network, without noticing it, and an unnecessary charge will be taken or the user of a terminal will perform unnecessary circuit use.

[0005] Managed, even if a user does not pay an unnecessary telex rate, as transceiver communication can surely be performed, when this invention solves this point and the terminal of a communications partner is located in the range in which transceiver communication is possible, a communication entrepreneur side makes a technical problem realization of the communication system which lost using limited radio circuit resources vainly.

[0006]

[Means for Solving the Problem] Two or more terminals with which this invention performs radio in order to attain the above-mentioned purpose, In the communication system with which a base station and the transceiver communication with which the line network communication which possessed the line network and minded the aforementioned base station and the aforementioned line network, and the aforementioned terminals radiocommunicate directly are used together A partner position judging means to judge whether the terminal of the other party is in the field in

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which transceiver communication is possible. It is characterized by providing a communication-mode switch means to choose the aforementioned line network communication or the aforementioned transceiver communication according to the judgment result of the aforementioned partner position judging means, and to switch communication.

[0007]

[Embodiments of the Invention] Hereafter, an accompanying drawing is made reference and the communication device concerning this invention is explained in detail. The gestalt of the following operations makes an example the case where this invention is applied to the communication system of PHS, and explains. The composition of a PHS communication system is shown in drawing 1. The PHS communication system consists of network administration equipment 4 containing the positional information database 5 formed in the PHS terminal [which has PHS communication facility] 1, base station [which is connected through two or more PHS terminals 1 and radio] 2, network [containing ISDN (Integrated Services Digital Network) and PSTN (Public Switched Telephone Network : public switched telephone network)] 3, and communication entrepreneur side.

[0008] With this composition, PHS terminal 1-1 can call communication terminals, such as a general telephone terminal directly linked with other PHS terminals 1-2 and networks 3 through the base station 2 and the network 3, or can communicate by being called. The present position of PHS terminal 1 is managed by the network administration equipment 4 which has the positional information database 5 based on ID of the base station 2 where it is connected.

[0009] the cordless handset which carries out direct transceiver communication by PHS terminal 1-1 and 1-2' other than the communication connect function which minded such a network 3 by the PHS communication system -- it has a between direct telephone call function this cordless handset -- in a between direct telephone call function, common ID is beforehand registered to each other PHS terminal 1, and communication is performed based on the message serial number which distinguishes PHS terminal 1 with the common ID and same common ID

[0010] by this invention, when two or more PHS terminals 1 belong to the field in which transceiver communication is possible mutually, the communication mode at the time of call origination and the communication mode under telephone call are explained here for the purpose of offering the communication system boiled and carried out so that priority may be given to transceiver communication and it may surely be performed

[0011] The message serial number for performing transceiver communication of the same partner as the public line telephone number of the other party PHS terminal shall be linked and memorized, and has public line network communication and transceiver communication automatically switched in this system. Even if prepared in PHS terminal 1, this link function is prepared in the database of network administration equipment 4, and PHS terminal 1 reference may be made to be carried out each time. Moreover, even if the function of an automatic switch is also prepared in PHS terminal 1, it may be prepared in network administration equipment 4.

[0012] 1) Give and explain two examples as an example of the communication mode at the time of call origination at the time of call origination. The 1st example is a method which performs call origination in a public line network succeedingly, when a PHS terminal tries dispatch by transceiver communication first and arrival of the mail is not completed. the 2nd example It is asked to network administration equipment 4 whether the other party PHS terminal exists in the field in which transceiver communication is possible. It is the method which performs dispatch by transceiver communication when it is judged that it exists in the field in which transceiver communication is possible, and performs call origination in a public line network when that is not right.

[0013] The communication procedure in the case of trying dispatch by transceiver communication first to example 1 drawing 2 is shown. When it is confirmed by the link function that it is the partner point which has common ID for transceiver communication of the other party PHS terminal when PHS terminal 1-1 by the side of call origination dials the public line telephone number peculiar to other party PHS terminal 1-2 at the time of call origination and performs call origination in a public line network at it, dispatch by transceiver communication is performed at first. the case where other party PHS terminal 1-2 receives a message according

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to this -- (— drawing 2 (a)) -- communication is continued by transceiver communication as it is. On the other hand, when there is no response of arrival of the mail according to dispatch by transceiver communication, (drawing 2 (b)) and the public line network communication which minds a base station 2 and a network 3 succeedingly are tried, and the telephone call with a public line network is performed.

[0014] The communication procedure in the case of communicating to example 2 drawing 3 and drawing 4 by whether it exists in the field in which transceiver communication is possible, and asking network administration equipment 4 is shown. It sets to PHS and is [whether it awaits and each PHS terminal 1 sometimes belongs at any time by the base station 2 side in which base station 2 now, and] PS peculiar to each PHS terminal 1 at the time of a telephone call. CS peculiar to ID and each base station 2 ID investigated and the result is managed with network administration equipment 4.

[0015] If the public line telephone number peculiar to other party PHS terminal 1-2 is dialed at the time of call origination, it will judge whether network administration equipment 4 has other party PHS terminal 1-2 in the communications area of the same base station. When it is judged that other party PHS terminal 1-2 has network administration equipment 4 in the communications area of the same base station, it considers mutually that transceiver communication is possible, and that is notified to PHS terminal 1-1 by the side of call origination (drawing 3).

[0016] PHS terminal 1-1 by the side of the call origination which received this notice performs dispatch by transceiver communication succeedingly. Under the present circumstances, when it does not go into the area of transceiver communication in fact and transceiver arrival is not able to be performed, call origination by the public line telephone number is performed again. Network administration equipment 4 recognizes this relapse call, and realizes the telephone call with a public line network.

[0017] When it is judged that network administration equipment 4 does not have the inside of the communications area of the same base station of 1-2 other party PHS terminals to call origination, while considering that transceiver communication is impossible and notifying that to PHS terminal 1-1 by the side of call origination on the other hand, the call origination by the public line telephone number is answered, and the telephone call with a public line network is realized (drawing 4).

[0018] In order to realize this, the predetermined function for managing and performing the above processing to network administration equipment 4 is prepared.

2) Give and explain three examples as an example of the communication mode at the time of a telephone call at the time of a telephone call. The 1st and 2nd examples to two sets of PHS terminals 1-1, and the midst to which 1-2 is telephoning mutually through a public line network. When PHS terminal 1-1 and either of 1-2 enter mutually in the area in which transceiver communication is possible. It is a method in the case of switching to transceiver communication from public line network communication. the 3rd example When mutual transceiver communication is likely to become impossible at two sets of PHS terminals 1-1, and the midst with which 1-2 is communicating by transceiver communication, it is a method in the case of switching to public line network communication from transceiver communication.

[0019] The communication procedure in the case of shifting to transceiver communication during a telephone call through a public line network at example 1 drawing 5 is shown. as for network administration equipment 4, these PHS terminals 1-1 and 1-2 are [two sets of PHS terminals 1-1, and 1-2] the same during a telephone call through a public line network -- it is -- it is -- having accessed the base station 2 which approached -- CS When it judges by ID, the shift to transceiver communication is aimed at as what is present in the position which approached mutually. When transceiver communication is possible, PHS terminal 1-1 cuts a public line network telephone call, and performs transceiver communication. When there is nothing in the position where two sets of PHS terminals 1-1 and 1-2 are in fact so near and connection by transceiver communication goes wrong, the telephone call which minded the public line network as it was is continued.

[0020] The communication procedure by other methods in the case of shifting to transceiver

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communication during a telephone call through a public line network at example 2 drawing 6 is shown. By this method, the function for two sets of PHS terminals 1-1 and 1-2 to be parallel during a telephone call through a public line network, and to perform the dispatch and the waiting receptacle by transceiver communication is added. Namely, through a public line network, during a telephone call, PHS terminal 1-1 by the side of call origination repeats dispatch of transceiver communication using another radio circuit, and performs it. Moreover, PHS terminal 1-2 of a destination side is awaiting the arrival by transceiver communication also during the telephone call through the public line network. Then, dispatch of transceiver communication of PHS terminal 1-2 of a destination side is received, and transceiver communication is established and performed after cutting the telephone call through a public line network.

[0021] The communication procedure in the case of shifting to communication with a public line network during a telephone call in transceiver communication at example 3 drawing 7 is shown. Two sets of PHS terminals 1-1 and 1-2 carry out call origination of PHS terminal 1-1 detected when one of PHS terminals (temporarily 1-1) detected that the receiving level between non-railroad sections fell during the telephone call by transceiver communication to a base station 2-1, and the call connection by public line network communication is required. When the receptionist response to this call connection comes on the contrary from a base station 2-1, PHS terminal 1-1 cuts transceiver communication immediately, and performs public line network communication which goes via a base station 2 and a network 3.

[0022] Since the channels of the radio used by public line network communication and transceiver communication differ when the above example is applied to the present PHS, in order to perform two kinds of communications at the time of a correspondence-procedure switch, two radio functions are needed.

[0023]

[Effect of the Invention] As explained above, invention of the claim 1 of this invention In the communication system with which two or more terminals which perform radio, a base station, and the transceiver communication with which the line network communication which possessed the line network and minded the base station and the line network, and terminals radiocommunicate directly are used together The terminal of the other party is characterized by providing a partner position judging means to judge whether it is in the field in which transceiver communication is possible, and a communication-mode switch means to choose line network communication or transceiver communication according to the judgment result of a partner position judging means, and to switch communication. Thereby, when a terminal is mutually to the field in which transceiver communication is possible, a telephone call surely comes to be performed by transceiver communication, and although transceiver communication was possible for the user, since he used the expensive public line network, he loses problem that a telex rate unnecessary originally must be paid. Moreover, although charged also for a communication entrepreneur side, it can lose using limited radio circuit resources vainly.

[0024] It has the number link means to which the telephone number for invention of the claim 2 of this invention performing line network communication and the message serial number for performing transceiver communication are made to link, and is characterized by a communication switch means switching communication automatically according to the content of a link of a number link means. By this, the communication which carried out call origination by the public line telephone number is switched to transceiver communication, or it becomes possible automatically to switch to public line network communication from the transceiver communication called by the message serial number of transceiver communication, and a switch is realized automatically, without performing operation excessive for a switch, and communication system excellent in user-friendliness can be realized.

[0025] Invention of the claim 3 of this invention applies PHS as a basic communication system of the above-mentioned communication system. Thereby, the function of PHS can use effectively and can realize communication system cheap as a whole and functional.

[0026] For the mutual terminal it is [terminal] a candidate for communication, invention of the claim 4 of this invention and a claim 7 is [a partner position judging means] CS of the base station where it belongs. When ID is in agreement, it is characterized by judging with it being in

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the field in which transceiver communication is possible. Thereby, the position judging of a partner terminal can be easily performed using a certain function from the former, and a system can be constituted at a low price.

[0027] When invention of the claim 5 of this invention and a claim 8 has a dispatch means and a call waiting means to perform arrival by transceiver communication during line network communication, during the telephone call which sends transceiver communication during line network communication and dispatch and arrival of transceiver communication are established during line network communication, it carries out that a communication switch means switches line network communication to transceiver communication as the feature. When the possibility of transceiver communication newly occurs by this, it can surely switch to transceiver communication, and a user loses problem that the telex rate using the expensive public line network must be paid, and a communication entrepreneur side can lose using limited radio circuit resources vainly.

[0028] Invention of the claim 6 of this invention and a claim 9 is characterized by a terminal switching transceiver communication to line network communication by the communication switch means, when it has a communication quality judging means to judge the communication quality of transceiver communication and a communication quality judging means judges aggravation of communication quality during transceiver communication. When it is lost that this continues transceiver communication, with a speech quality deteriorating and the speech quality of transceiver communication deteriorates, it is automatically switched to public line network communication, and the quality of a telephone call can be maintained.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing showing the composition of the PHS communication system to which this invention is applied.

[Drawing 2] Explanatory drawing showing the communication procedure of the gestalt of 1 operation of this invention.

[Drawing 3] Explanatory drawing showing the communication procedure of the gestalt of other operations of this invention.

[Drawing 4] Explanatory drawing of this invention showing the communication procedure of the gestalt of other operations further.

[Drawing 5] Explanatory drawing of this invention showing the communication procedure of the gestalt of other operations further.

[Drawing 6] Explanatory drawing of this invention showing the communication procedure of the gestalt of other operations further.

[Drawing 7] Explanatory drawing of this invention showing the communication procedure of the gestalt of other operations further.

[Description of Notations]

1 [.. A network, 4 / .. Network administration equipment, 5 / .. Positional information database] A PHS terminal, 2 .. A base station, 3

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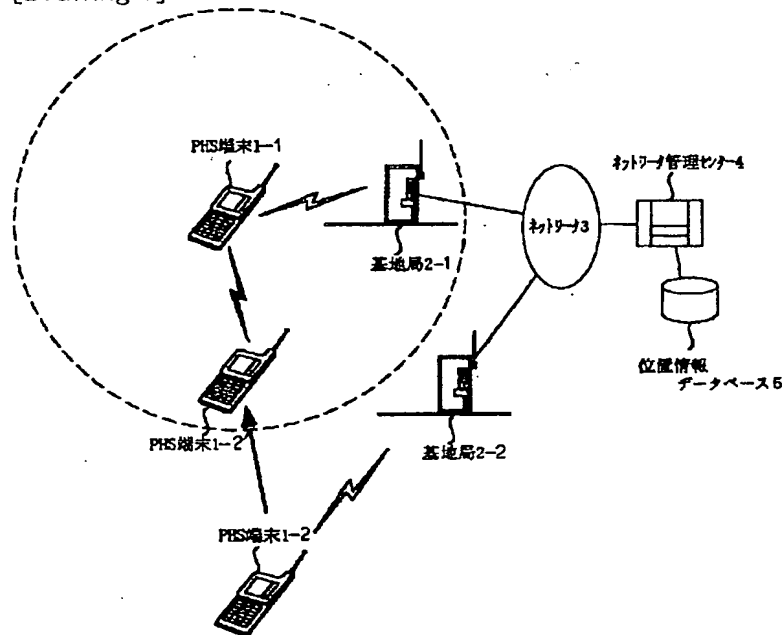
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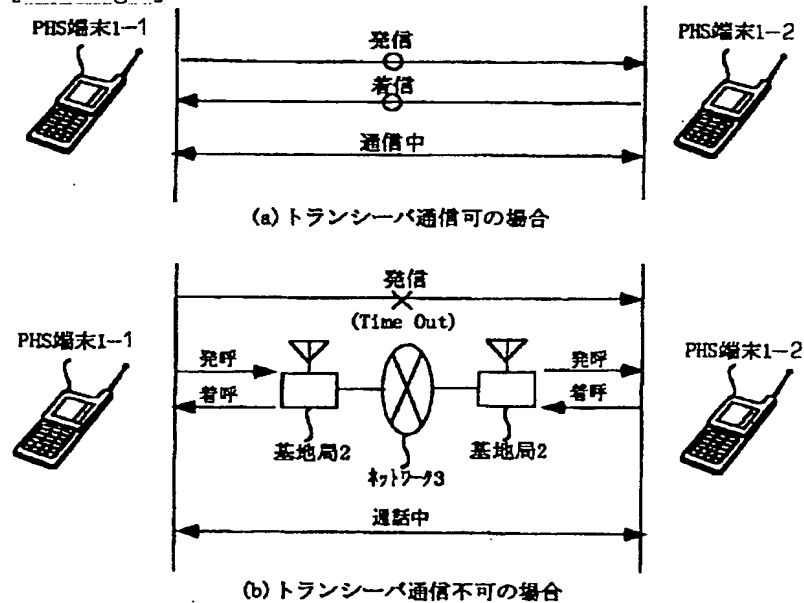
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DRAWINGS

[Drawing 1]

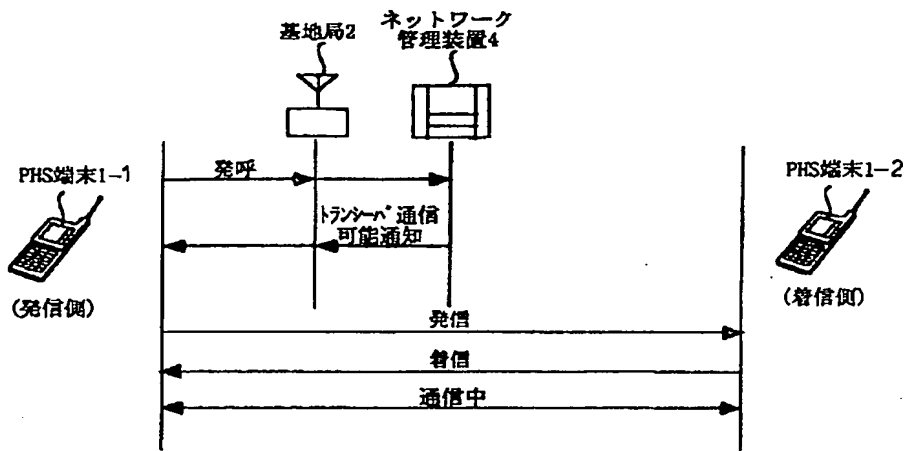


[Drawing 2]

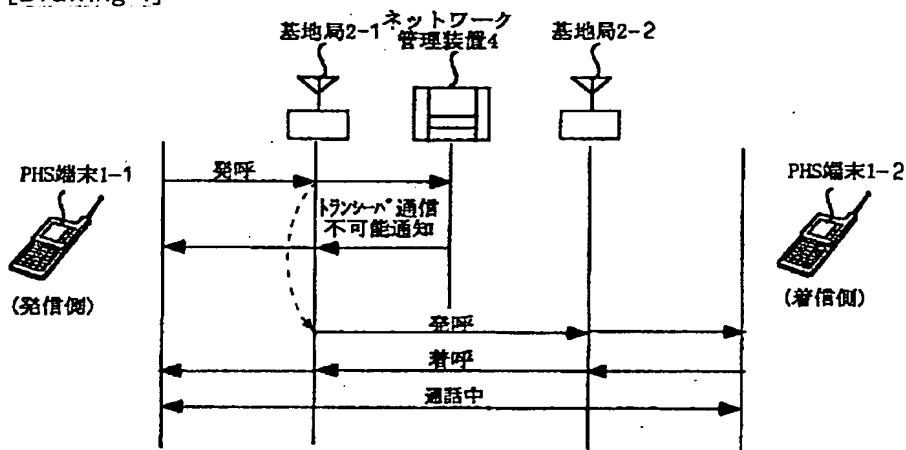


[Drawing 3]

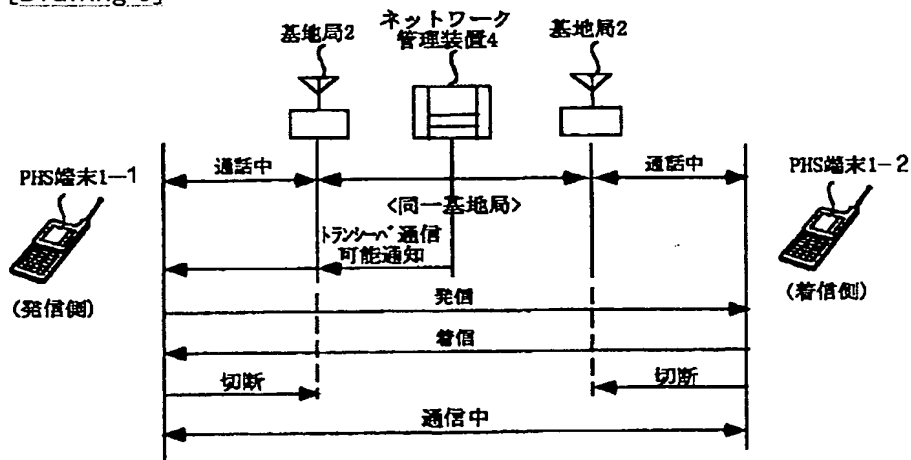
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[Drawing 4]

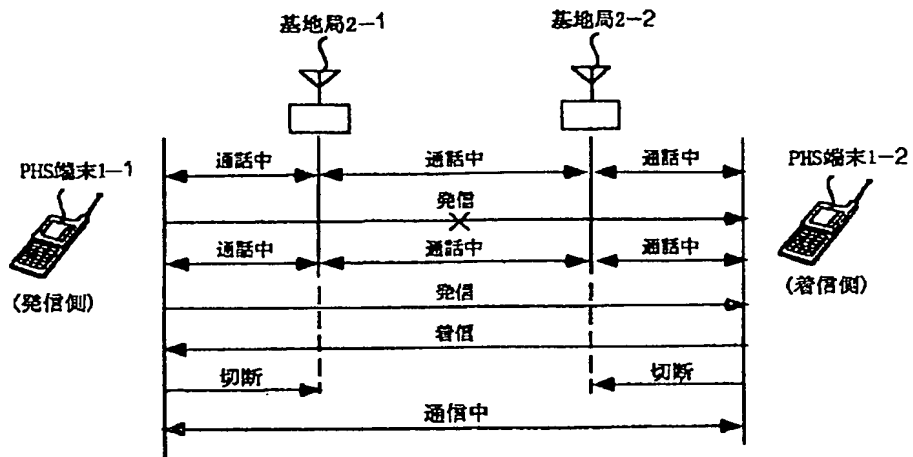


[Drawing 5]

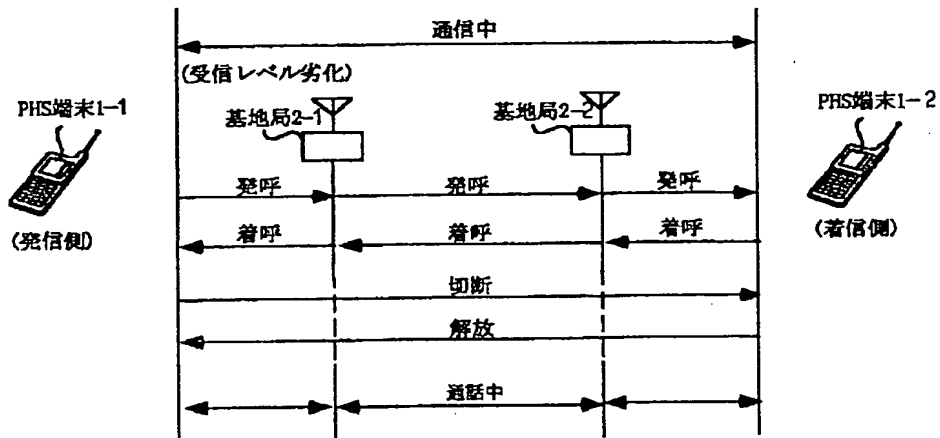


[Drawing 6]

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[Drawing 7]



[Translation done.]

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